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FOR AN IMPROVED JOURNAL

A reader of the Journal recently wrote "the Journal is so highly technical that I cannot grasp the meaning of the articles it publishes. It is my opinion that the professors who write all this phraseology are trying to see who can write the biggest conundrum for some poor sap farmer to fathom out. Give me something in plain English that can be understood—then I'll subscribe." Fortunately not all readers feel as does this correspondent since a grower wrote that the information contained in a recent issue of the Journal had more than repaid him for all the years he had subscribed.

It is impossible to select articles for this or any other publication which will appeal to all readers. Your editor has attempted to include information of both a technical and a popular nature in each issue in order to reach all classes of readers. It is difficult, however, to accomplish this very desirable objective. Unfortunately also, some scientific articles are difficult to read. It is just as true that some articles written for popular consumption, frequently occupy considerable space and say little or nothing.

It must be generally conceded, however, that our best potato growers should be able to grasp the meaning of most scientific articles. If they cannot, it is time that the writers gave some thought to the technique of writing. An article may be clear, concise and still be scientific. Alfred H. Brooks recently wrote that "Some scientists appear to believe that unless their writings are ponderous they will lose standing among their colleagues."

The American Potato Journal should serve the potato "scientist" as well as the intelligent producer. There is need for a Journal of this kind in order to acquaint the grower with the new developments in the industry. Your editor does not feel that the Journal has been entirely successful in accomplishing this and welcomes suggestions as to what steps can be taken to make the Journal of real service to all readers.

POTATO TUBER BRUISING IN THE CLEVELAND AND ROCHESTER MARKETS[1]

E. V. HARDENBURG

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Consumer preference studies of potatoes sold at retail in large cities have been made recently by investigators in several states. These studies were designed primarily to get basic factual information which might help both growers and dealers to better satisfy consumer demand and perhaps stimulate consumption. A project of this type was begun by the New York State College of Agriculture in the spring of 1936 in Cleveland and continued both here and in Rochester. One phase of this work involved a rather complete grade and defect analysis of 15-pound retail store and market samples assembled in these markets and shipped to Ithaca. To date over 500 such samples have been analyzed and the work is still in progress. Preliminary results indicated that of all the defects causing damage found in these potatoes, bruising was the most serious. This fact led to further study of the extent and principal causes of bruising. The more important results are reported in this paper.

METHOD OF SAMPLING AND ANALYSIS

All samples were purchased at retail stores including chain groceries, independent groceries and fruit and vegetable stores. Most of these were of 15-pound weight and represented a duplicate of potatoes sold to the consumers on a given day. Care was used to avoid taking duplicate samples from any one lot of potatoes in the same store. These samples were then assembled at a storehouse where they were later packed in padded barrels for shipment. In determining damage and serious damage from bruising, definitions stated in U. S. potato grade standards were carefully observed. The extent of damage found in 515 retail store samples is shown in table 1.

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[1]Published as Paper No. 169, of the Department of Vegetable Crops, Cornell University.

TABLE 1.—*Potato tuber bruising in the Cleveland and Rochester Markets.*

Market	Season	Number of Retail Samples	Average Per Cent by Weight of Tubers		Bruising Damage As Per Cent of Total Damage from All Causes
			Damaged	Seriously Damaged	
Cleveland	Mar.-Apr. 1936	143	7.07	2.44	42.7
Cleveland	Oct.-Dec. 1936	247	6.59	2.31	39.8
Rochester	Jan.-Feb. 1937	125	4.55	1.87	34.8
Total and Averages	....	515	6.11	2.21	38.6

The data in table 1 indicate an average of 6.11 per cent damage and 2.21 per cent serious damage from bruising alone. Tubers so affected would require attention beyond that incident to ordinary paring to properly prepare them for the table. A probable reason why the Rochester potatoes showed less damage than those found in Cleveland is the fact that the latter consists of a much higher proportion of Green Mountains. This fact will be discussed further under the subject of varieties. The importance of bruising as compared with other defects is also shown in table 1 by the fact that an average of 38.6 per cent by weight of damage from all causes was caused by this factor. That portion of bruising damage which probably occurred after these potatoes reached the city is indicated in a later table.

TYPE OF RETAIL MARKET RELATED TO BRUISING

Three types of retail stores were visited in the course of this study. These were chain groceries, independent groceries, and fruit and vegetable stores. In addition, samples were obtained from institutions including restaurants, cafeterias, hotels and hospitals. Among the different retail outlets, buying and handling practices, sources of supply, varieties and the like naturally differ. These differences might well be expected to influence the amount of bruising injury found. The combined average damage and serious damage from bruising for each of these four groups is shown in table 2.

TABLE 2.—*Relation of type of retail market to tuber bruising in 527 potato samples.*

Type of Retail Market	Per Cent by Weight of Damage and Serious Damage[1]					
	Cleveland Mar.-Apr. 1936		Cleveland Oct.-Dec. 1936		Rochester Jan.-Feb. 1937	
Chain Groceries	11.62	(76)	9.63	(121)	8.97	(34)
Independent Groceries	5.32	(44)	8.70	(56)	5.54	(60)
Fruit & Veg. Stores	11.01	(23)	7.93	(70)	6.06	(14)
Institutions	....	...	6.94	(12)	4.37	(17)
Averages	9.51	(143)	8.85	(259)	6.42	(125)

[1]Figures in parentheses represent number of samples analyzed.

The injury from handling by chain store methods is obviously greater than that caused by other methods. Several facts may account for this difference. Chain store organizations generally handle potatoes mostly received in carlots. This involves transfer to a truck, unloading and temporary storage at a warehouse, reloading for delivery to the stores, another unloading and frequently a final dumping into store bins. In Cleveland a large proportion of the total chain store supply consists of Green Mountains which are known to be very susceptible to bruising. Independent groceries and fruit and vegetable stores in both the Cleveland and Rochester markets handle a higher proportion of Rural type potatoes. Furthermore, a fairly large part of their total supply is obtained directly from truckers and farmers. The extent of damage from bruising found in potatoes bought by institutions seems to be the least of the four groups. These agencies buy in larger units, do more direct buying and may be more selective of market quality. In the case of hospitals, cafeterias and hotels their potatoes are probably subject to less handling than those sold by any of the retail stores.

SUSCEPTIBILITY OF VARIETIES

Various factors may account for the susceptibility of a given variety to bruising. Some of these are inherent in the variety itself,

whereas others more or less may affect its condition during storage or handling. The average total damage from bruising as determined for each of the principal varieties found in the Cleveland and Rochester markets is shown in table 3.

TABLE 3.—*Relation of variety to damage from bruising in 521 retail potato samples.*

Variety	Per Cent by Weight of Damage and Serious Damage[1]					
	Cleveland Mar. 1936		Cleveland Oct. 1936		Rochester Jan. 1937	
Green Mountains	15.86	(41)	13.79	(80)	11.07	(4)
Russet Rurals	7.75	(33)	7.14	(103)	10.21	(31)
White Rurals	2.47	(3)	6.22	(21)	5.16	(74)
Russet Burbanks	6.08	(26)	4.85	(44)	1.89	(5)
Bliss Triumph	7.04	(33)	....	....	0.95	(2)
Irish Cobbler	....	....	18.29	(4)	5.46	(8)
Red McClure	9.94	(5)	5.50	(4)	....	....

[1]Figures in parentheses represent number of samples analyzed.

Outstanding in the comparison of varieties is the fact that Green Mountain showed the greatest amount of injury. Contrary to the belief of many growers, Russet Rural carried a significantly higher percentage weight damage from bruising in each case than did the White Rural. In general, the Russet Burbank showed less mechanical injury than the Rurals. Bliss Triumph, found prominently in Cleveland in the spring of 1936, showed about the same amount of bruising as the Russet Rurals and Russet Burbanks. However, in spite of the fact that they were new crop potatoes from Florida, they were protected from injury by being shipped and handled in bushel crates. Too few Cobblers and Red McClures were analyzed to allow a fair comparison. These results do not substantiate the claim that thickness and russeting of the skin of potatoes are factors affecting varietal susceptibility to bruising. Further indication of how varieties differ in their resistance to mechanical injury during handling is developed in table 4.

TABLE 4.—*Increase in bruising damage from car to retail market as related to variety—Cleveland, November, 1936*

TABLE 4.—*Increase in bruising damage from car to retail market as related to variety—Cleveland, November, 1936—October, 1937*

Variety	Year	Number of Samples	Per Cent by Weight of Bruised Tubers								
			In Car			Retail Market or Store			Increase		
			Not Damaged	Damaged	Seriously Damaged	Not Damaged	Damaged	Seriously Damaged	Not Damaged	Damaged	Seriously Damaged
Green Mt.	1936	19	31.78	4.15	2.08	49.94	16.65	9.28	18.16	12.50	7.20
Green Mt.	1937	6	54.00	3.90	0.83	62.50	7.10	1.10	8.50	3.20	0.27
Green Mt.	1937	4	50.20	1.87	0.00	68.97	10.20	5.00	18.77	8.33	5.00
Green Mt.	1937	3	64.17	3.60	0.83	75.27	8.60	2.50	11.10	5.00	1.67
Green Mt.	1937	12	52.80	3.07	0.13	65.67	5.67	2.33	12.87	2.60	2.20
Green Mt. Ave.		44	43.09	3.66	1.26	58.62	12.16	4.47	15.53	8.50	3.21
White Rural	1937	4	28.53	1.27	0.00	48.13	3.53	0.00	19.60	2.26	0.00
Chippewa	1937	6	47.10	0.83	0.00	70.70	0.97	0.00	23.60	0.14	0.00
Katahdin	1937	4	36.47	0.83	0.63	59.17	1.47	0.63	22.70	0.64	0.00
Total and Grand Averages		58	41.92	2.93	0.97	59.24	9.38	3.31	17.32	6.45	2.34

MARKET HANDLING AS A SOURCE OF BRUISING

In November of 1936 and again in the fall of 1937, a further and more detailed study of tuber bruising was made in Cleveland. The main purpose was to determine how much of the bruising found in potatoes at retail resulted from city handling methods. A further comparison of varieties and of different handling methods was also possible. In all cases, 30 pound samples were taken from sacks and analyzed for the different classes of bruises at the car and before unloading. These samples were replaced in the bags and tags bearing a sample number attached to provide for later identification. In this way, each lot of samples was again similarly analyzed after it was delivered to the store or other retail market. Usually not more than two or three days intervened. In 1936, only 19 samples of Maine Green Mountains from three cars were studied. In 1937, 39 additional samples including several varieties, types of packages and methods of handling were included. In this study, the bruised tubers weighed were classed as bruised but not damaged, damaged, and seriously damaged. These results are also tabulated in table 4.

Averages for the 58 samples show an increase of more than threefold in both damage and serious damage from bruising as a result of handling between the car and the retail market. Although the percentage is perhaps of small concern before these potatoes are unloaded, it amounts to a significant item by the time they are presented to the consumer. At retail, the per cent by weight of damage averaged 9.38 and of serious damage 3.31, a total of 12.69 per cent. Green Mountains packed in 15-pound paper bags showed about the same or slightly less increase in injury from handling than the same variety packed in 100 pound sacks.

A few samples of White Rurals, Chippewas and Katahdins were taken for comparison with Green Mountains. No Russet Rurals were available. Almost without exception, the Green Mountain variety showed both a greater amount of total damage from bruising in the car and a greater increase in injury from subsequent handling than did the other varieties. It is especially noteworthy that both Chippewa and Katahdin resisted bruising even better than the White Rurals despite the fact that they were subjected to much rougher treatment.

SUMMARY

1. Retail store samples of potatoes purchased in Cleveland and Rochester and analyzed at Ithaca showed an average of 6.11 per cent

damage and 2.21 per cent serious damage from tuber bruising. This represents 38.6 per cent of the total damage from all causes.

2. Bruising damage averaged considerably higher in chain groceries than in independent groceries, and fruit and vegetable stores. Injury was least in potatoes used by institutions such as hotels, cafeterias, restaurants and hospitals. These differences are caused partially by different methods of buying and handling.

3. The Green Mountain variety showed a much greater percentage of injury than any other variety studied. White Rurals appeared to resist bruising more than Russet Rurals when handled in the same way.

4. Fifty-eight 30-pound samples analyzed at the car and later in the retail market showed an increase of more than three-fold in total bruising damage from handling, the final total percentage by weight being 12.69 per cent.

5. The Green Mountain was the least resistant to rough handling. Chippewa and Katahdin, two new varieties, showed an even smaller increase in damage from bruising than did the White Rurals.

GREEN MANURE CROPS FOR POTATOES[1]

ORA SMITH

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Until quite recently the rotations and cropping systems involving the production of potatoes in Upstate New York have been such that, more or less unconsciously, the growers have maintained the soils with a relatively high level of organic matter. Potatoes were grown in rotations once every four or five years with the tops, roots, stubble and other crop refuse plowed under between potato crops. The organic matter was rather easily maintained at a fairly high level without any special effort. With this system of producing potatoes, however, several objectionable features were observed. Growing twenty acres of potatoes annually in a five-year rotation, for instance, made it necessary that the grower set aside 100 acres of his farm to be maintained for potato production. Not many farms have so large an amount of good potato soil. This meant, therefore, that many growers were trying to raise good quality potatoes and high

[1]Published as Paper No. 168 at Department of Vegetable Crops, Cornell University.

yields on soils entirely unsuited for those purposes. Obviously, shorter rotations, or the growing of potatoes on the same area each year, would make it possible to select the best potato soils on the farm and still maintain the same acreage each year.

Other factors, such as the prevalence of tuber insects and diseases in the long rotations, have also made it highly desirable to abandon the longer rotations in favor of the shorter ones.

One of the first questions which arises concerning the shorter rotations, or the production of potatoes on the same area each year, is that of "how is the organic matter content of the soil to be maintained or increased?"

Two series of experiments have been inaugurated in New York state recently, one of the purposes of which is to determine the best green manures and cover crops and methods of growing and incorporating them in the soil for highest yields and quality of potatoes. In one series of experiments the production of potatoes on the same area every year is compared with several two-year and five-year rotations. These experimental plots are located in three widely separated counties in the Western and Northern New York potato areas.

The systems of cropping employed in one of these experimental areas on soils of approximately pH 5.1 are as follows:

Systems of cropping:

1. Potatoes every year,—without cover crop, without manure (1 yr. rotation).
2. Potatoes every year,—without cover crop, with manure (1 yr. rotation).
3. Potatoes every year,—with rye cover crop, with manure (1 yr. rotation).
4. Potatoes every year,—with rye cover crop, without manure (1 yr. rotation).
5. Potatoes (rye cover crop),—field pea beans (rye cover crop) (2 yr. rotation).
6. Potatoes (rye cover crop),—corn drilled for green manure, (rye cover crop) (2 yr. rotation).
7. Potatoes (rye cover crop),—clover and timothy for green manure (2 yr. rotation).
8. Potatoes (rye cover crop),—field pea beans—winter wheat for grain seeded with clover and timothy—clover and timothy hay—clover and timothy hay (5 yr. rotation).
9. Potatoes (rye cover crop)—barley for grain seeded with clover and timothy for hay—clover and timothy hay—clover and timothy hay—field pea beans (5 yr. rotation).

In the Northern New York experimental plots soybeans for hay are grown in the fifth, eighth and ninth rotations instead of field pea beans because pea beans are not grown commercially in that area. Spring wheat also is substituted for winter wheat in rotation number eight.

In the experimental plots located in the limestone belt of Western New York, sweet clover is grown instead of clover and timothy in the seventh rotation system, and in the eighth and ninth rotations alfalfa is grown in place of clover and timothy. In the Northern New York plots and in the limestone belt of Western New York, a tenth system has been added in which potatoes are grown every year on the same area with no cover crop, no manure and no commercial fertilizer. All other potato plots receive equivalent amounts of 5-10-5 fertilizer each year potatoes are grown. All plots are replicated five times and all crops in all rotations are grown every year. The plots for these tests are one-fiftieth acre in area.

These experiments have been in progress only two years, therefore, no conclusions can be drawn from these limited results. Some of the trends, however, may be of interest to growers and investigators and are given briefly in this paper. There are some indications that soil treatment and crops preceding potatoes may influence the per cent of final stand of potatoes. In the limestone area, where potatoes were grown each year on the same plots, those plots which had manure applications of 12 tons to the acre the preceding fall appeared to have a higher percentage of stand than those which had no manure application. The percentage of stand following alfalfa was significantly lower than the stand in any other rotation. Fertilizer injury to stand was also shown by the lower percentage of stand in all plots receiving row applications.

On quite acid soils in Northern New York, the percentage of stand of potato plants following field pea beans and also following potatoes without cover crop, manure or commercial fertilizer is significantly lower than in any other rotation. Although there were no significant differences in the percentage of stand among any of the plots on the acid soils of the Steuben County area there were marked differences in time of death or maturity of the plants. Plots to which manure had been added and which had grown potatoes the previous year had, on the 20th of September an average of 62 dead plants on each plot, whereas those receiving the same treatment except the omission of the manure treatment, averaged 138 dead plants on each plot. Following pea beans, one year of clover and timothy, and corn

for green manure the average number of dead plants on each plot was 110, 120, and 162, respectively.

The total yields of potatoes in the Northern New York plots were significantly higher on those plots following potatoes and which received 12 tons of manure to the acre and in those plots in which one-year clover and timothy preceded potatoes, than in any of the other systems of cropping. By far, the lowest yield was obtained from the plots which grew potatoes each year and received no manure, no cover crop and no commercial fertilizer. Of those plots receiving the regular application of approximately 1200 pounds to the acre of a 5-10-5 fertilizer the lowest yields were obtained following pea beans and following corn plowed under as a green manure.

In the Steuben County plots, located on acid soil, the total yields were significantly highest in those plots which had grown potatoes the previous year and had received an application of 12 tons to the acre of manure during the intervening winter. The lowest yields were obtained following corn plowed under as green manure and following pea beans. There were no significant differences in yield of potatoes between any of the systems of cropping in the plots in the limestone area. This probably was caused by the extremely dry season of 1936 which prevented nearly all growth on the plots during that season with, therefore, little or nothing to plow under in preparation for the 1937 crop. However, those plots to which manure had been applied the previous winter did not produce any greater yields than those without manure applications, as was the case in the remaining two experimental areas.

Several additional experiments were conducted during the past season to determine the feasibility of adding various forms of nitrogen to green manure crops previous to plowing under in the spring. The additions of lime and nitrogen to coarse organic matter are advocated to hasten its decomposition so that the early growth of potatoes following the green manure crop will not be retarded.

The treatments just preceding plowing under of the heavy growth of rye in the spring were as follows:

1. 400 pounds calcium cyanamid to the acre, broadcast.
2. 200 pounds calcium cyanamid to the acre, broadcast.
3. Ammonium sulphate and hydrated lime, equivalent to the nitrogen and lime in 400 pounds cyanamid plus sufficient lime to neutralize the ammonium sulfate, applied broadcast.
4. Hydrated lime equivalent to the amount used in treatment No. 3.
5. Check—nothing applied.

After plowing and partial fitting, and immediately before planting the potatoes, the following applications were made broadcast to the same areas and worked into the soil:

1. Superphosphate and potassium chloride. Final application equals 1200 lbs. 5-10-5 to the acre.
2. Superphosphate and potassium chloride. Final application equals 1200 lbs. 2.5-10-5 to the acre.
3. Superphosphate and potassium chloride. Final application equals 1200 lbs. 5-10-5 to the acre.
4. Ammonium sulphate, superphosphate and potassium chloride. Final application equals 1200 lbs. 5-10-5 to the acre.
5. Ammonium sulphate, superphosphate, potassium chloride and hydrated lime equivalent to that in treatments 1, 3, and 4. Final application equals 1200 lbs. 5-10-5 to the acre.

The first application was made on the 21st of May, the second application on the 29th of May and the potatoes planted on the 31st of May.

There were no significant differences in yields among any of the treatments that received the 1200 pounds to the acre application of 5-10-5 fertilizer, regardless of time or method of application. The yields from the plots which received only one-half the above amount of nitrogen were significantly lower than the others. No increases in yield therefore, were obtained this year in two widely separated areas, from the use of nitrogen and lime applications to the green manure crops of rye preceding potatoes. This lack of increase in yield of potatoes on plots receiving applications to the cover crop may be caused by the exceedingly heavy rainfall early in the season which leached the nitrogen applied on the surface after plowing, down to the organic matter in the soil. This resulted in the nitrogen being in direct contact with the organic matter just as well as that which was applied before plowing.

In another comprehensive experiment at Ithaca our purpose is to grow a combination of green manure crops one year to furnish a maximum amount of dry matter and then to follow with three successive potato crops. Some of the 15 cropping systems which we are employing are shown in table 1, as well as the dry matter production of green manures during the first year. Oats were used in each case instead of rye seeded the previous fall because these experiments were initiated in the spring. Hereafter, rye will be used because of its winter hardiness.

TABLE 1.—*Production of green and dry weight of green manure crops during* 1937

Rotation Number	Green Manure Crop	Seeded	Green Wt. Per Acre (Pounds)		Dry Wt. (Per Cent)	Dry Wt. Per Acre (Pounds)		Plowed under
2	Silage corn (broadcast)	May 22	66,792		20.76	13,866		Aug. 31
4	Oats	May 22	32,791	78,408	10.9	3,574	10,234	July 6
	Pearl millet	July 8	45,617		14.6	6,660		Sept. 22
8	Oats	May 22	38,478	63,162	11.1	4,271	9,257	July 6
	Sudan grass	July 8	24,684		20.2	4,986		Sept. 22
10	Oats	May 22	34,122	46,222	11.1	3,788	7,055	July 6
	Hemp	July 8	12,100		27.0	3,267		Sept. 22
14	Canada field pea and oats	May 22	30,976		10.2	3,160		July 17
18	Blue lupine	May 22	22,022		24.2	5,329		Aug. 31
20	Oats	May 22	35,332	52,272	12.3	4,347	8,209	July 6
	Soybeans	July 8	16,940		22.8	3,862		Sept. 22
25	Sunflower	May 22	74,536		18.28	13,625		Aug. 31

With the crops used in these tests and the particular dates of planting and plowing under the greatest yields of dry matter were produced by silage corn and by sunflowers. The crops of corn and sunflower were excellent with good stands and heavy, tall growth. Rye also is seeded after these crops are plowed under, and generally attains a good size by plowing time the following spring. This will add materially to the organic matter content of these plots. The crop next highest in dry matter production was pearl millet, although it was seeded late, following oats. Following rye, which is seeded the previous fall and plowed under earlier than the oats the yield of pearl millet no doubt would be much higher. Sudan grass yielded well in dry matter even with the late seeding. The late planting of hemp, no doubt, reduced the yield considerably, for it formed seed stalks, and the terminal growth is always arrested by the shorter days of September. If it had been planted earlier it probably would have attained much greater height before the arrival of shorter days and the appearance of seed stalks. Hemp stems are exceedingly woody and, therefore, the plant has a high dry weight percentage. It will be interesting to note the speed of decomposition of this material in the soil.

Late seeding of crops following the grains, such as oats or rye, is done for the purpose of allowing the grain to ripen and preferably to be harvested by heading or combining. This would allow a max-

imum amount of crop refuse to remain on the land. We have attempted to arrange the cropping systems to be as practical as possible with the removal of a crop, in this case a grain, even in the season which is devoted largely to the production of organic matter.

In order to determine how well the dense material of the corn, sunflower, and blue lupine was incorporated in the soil, pits were dug throughout the plow layer at right angles to the direction of plowing. It is fairly evident from these observations that complete retardation of capillarity from the lower to the upper layers of soil is not likely with the organic matter occupying so small a portion of the area. Further studies of this kind will be made in the spring before plowing under the rye crop now occupying this area in order to study the root growth of the rye and the stage of decomposition of the previous green manure crop. These experiments are to be continued for a long period of time with studies of the changes occurring in the soil as well as the yields of all crops.

A NEW POTATO DISEASE IN COLORADO

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A potato disease not previously reported from Colorado appeared in epidemic form in the Olathe district in Montrose County during the summer of 1937. Attention was first drawn to the epidemic in August because of the fact that cars of Bliss Triumph potatoes arrived at their destination showing very high percentage of wet rot. All these potatoes, at the shipping point, had passed inspection as U. S. Commercial or U. S. No. 1. It later developed that stock held over week ends in loading also developed considerable rot. Practically all lots of Triumphs developed rot, while Irish Cobblers from the same fields showed very little rot and practically no trouble was experienced in shipping this variety.

An examination of the tubers disclosed all stages of rot. The mildest forms showed a pale yellowish brown coloration in the vascular ring, and often showed necrotic threads, also in the area. In more severe cases, the vascular ring was partially decomposed. In severe cases, the tubers showed a watery or slimy spot on the surface, often at the stem end or surrounding an eye. The medullary area of these tubers was generally decomposed, and the skins were duller in color than the normal ones. They were held together by a more or less intact

cortex, but could be mashed in the hand, exuding a slimy, yellowish colored liquid. More or less bruising was present on all these tubers because of immaturity, and the fact that they were sorted over shaker sorters in the field. After holding for two or three days, the tubers with rotted centers were completely broken down. The sacks showed numerous wet spots and the slime had covered the majority of the tubers in the sacks. All skinned and bruised places showed the watery discoloration, indicating that infection had taken place.

An examination of the fields was made early in September. Most of the commercial stock had been harvested at that time, and the few remaining fields were matured and the vines were practically all dead. Very high percentages of rotted tubers were found in these fields.

The general practice at Olathe is to plant a seed plot in early July, using certified seed, and using the increase from this plot for the commercial planting the following spring. A number of these seed plots were visited. Here a more accurate picture of the disease could be obtained, as the vines were still green and growing. The Cobbler and Triumph vines in the same field showed equal percentages of symptoms. Some of these vines were dead, and the underground stems of these were hollow, the pith being rotted away. They also showed rotted stolons and roots, and the brownish colored infected areas were also visible on the outside of these underground stems. The tubers on the dead plants were often mere shells, the cortex being intact and the medulla a mass of slimy rot. A peculiar circumstance was that, in spite of this total decomposition, there was no offensive odor.

These tubers were not brightly colored, but were a dull brick red to grayish looking. Other tubers were pale brown in the medullary area, in the portion which was still solid, but the vascular tissue was more or less decomposed. Others merely showed a brownish, watery discoloration in the vascular area. Dead vines in the seed plots at this time ran from 2 to 10 per cent. There were also from 2 to 50 per cent wilted plants in these fields. The plants were not discolored as in the case of Blackleg or *Fusarium*, but were green in color except for a few of the lower leaves, which were yellow, with necrotic areas in the leaflets and petioles.

Externally the underground stems appeared normal, but the pith was destroyed practically to the ground line, and above this hollow area was an area where the pith was watery appearing. It appeared that these plants had wilted quite rapidly. There were often plants

with only one or two stems wilted, the others appearing normal. Some of the tubers on these plants showed discoloration in the vascular tissue, but the majority appeared normal.

An examination together with a culture of the stem end tissues of these tubers revealed a high infestation of bacteria. An examination of fields of Rural New Yorkers in other parts of the country revealed a 1 per cent infestation early in September. From the symptoms it appears that this disease may be Bacterial Wilt or Brown Rot, (*Bacterium solanacerarum*, E.F.S.) as described by Smith (1) or Bacterial Wilt and Rot as described by Bonde (4) and by Savile and Racicot (5). The identification of the organism is not yet completed.*

The potato district around Olathe is one of the early districts of the state, shipping the bulk of the crop in August. Temperatures are often quite high during the day, but are considerably lower at night. It was found by Meier and Link (2) that the optimum temperatures for the development of Brown Rot were between 77° F. and 97° F. and that the disease was inhibited at temperatures below 55° F.

From table 1, it may be seen that temperatures in Montrose County are favorable for the development of this disease any year, and that the temperature and number of days favorable to the development of the disease in 1937 do not account for the epidemic. From a temperature standpoint, conditions were not so favorable in 1937 as in most of the other years listed. Temperatures were also slightly more favorable than those during the epidemic year 1935 in Florida as reported by Eddins (3).

Temperatures were higher than normal during nearly all of the ten-year period reported in table 1. The normal mean for June is 65.2° F.; the normal mean for July is 70.6° F., and the normal mean for August is 68.4° F.

The rainfall was below normal during each of the three months in 1937. The normal mean for June is 0.42 inches; for July 0.86 inches; and for August 1.35 inches. The amount of rainfall was also below most of the previous nine years as is shown in table 1. Eddins (3) also shows that the epidemic in Florida occurred in a year of low rainfall. The mean annual precipitation at Montrose is only 9.68 inches. All potatoes are raised by irrigation. Practically all the potatoes examined in 1937 were over-irrigated, as was indicated

*This work is being conducted by W. A. Kreutzer and E. W. Bodine of the Botany Department.

TABLE 1.—*Temperatures and rainfall at Montrose, Colorado, in relation to brown rot*

	June						July						August					
		No. of Days When Temp. Was Favorable to Brown Rot						No. of Days When Temp. Was Favorable to Brown Rot						No. of Days When Temp. Was Favorable to Brown Rot				
	Mean Temp.	Min. 55 or above	Max. 77 or above	Both Max and Min. above	Rain—Inches	Rain—Days	Mean Temp.	Min. 55 or above	Max. 77 or above	Both Max and Min. above	Rain—Inches	Rain—Days	Temp.	Min. 55 or above	Max. 77 or above	Both Max and Min. above	Rain—Inches	Rain—Days
1928	64.5	6	22	5	0.27	4	72.0	16	31	16	1.33	7	69.2	12	29	11	1.33	5
1929	67.5	9	28	9	0.00	0	72.0	25	30	25	1.30	11	70.0	21	29	20	1.07	6
1930	70.6	6	24	5	0.54	3	71.3	21	28	19	1.20	15	70.2	14	31	14	1.73	13
1931	70.4	13	27	13	0.35	5	75.7	24	30	23	0.85	5	71.5	16	31	16	0.68	5
1932	66.3	9	23	9	0.21	6	73.8	24	31	24	1.25	8	70.7	16	29	15	1.42	8
1933	70.6	10	30	10	0.01	1	75.4	26	31	26	0.43	6	70.7	13	31	13	1.21	8
1934	67.3	2	27	2	0.47	2	76.6	27	31	27	0.23	4	73.9	26	31	26	0.01	7
1935	60.7	8	20	8	0.00	0	74.6	22	31	22	0.83	5	72.4	20	31	20	1.24	8
1936	70.4	15	25	14	0.20	4	74.2	22	29	21	1.08	6	71.3	20	28	20	1.21	11
1937	64.8	7	20	5	0.20	2	76.7	20	25	18	0.66	6	70.1	18	29	15	0.71	8
Weather conditions at Hastings, Fla., March and April, 1935, a severe Bacterial Wilt epidemic year, from Eddins (3)							March 68.1	21	23	..	0.20	..	April 70.0	18	26	..	2.21	..

by greatly enlarged lenticels, and the fact that when freshly dug tubers were cut, the juice actually "squirted" from them.

Eddins (3) states, "Low, moist locations in fields appear to be more suitable for the survival of the causal organism, and the development of the disease than high, dry land, for in 1935 plant infection on most farms was greatest in moist or wet soil located near water furrows and ditches."

The soils around Olathe are quite heavy loams although Eddins (3) reports that Brown Rot occurred on all types of sandy soils at Hastings. Alkali is present in considerable quantities in this area, and soils range from pH 7.7 to pH 9. Eddins (3) reports that the organism survived at pH 8.71, which was the highest pH tested.

There are no Colorado potato beetles west of the Continental Divide in Colorado, but in 1937 there was the worst infestation of flea beetles known in that area. Smith (1) reported that plant infection could be reduced by controlling insect carriers of the disease, and that cultivation practices which would minimize root injury would help to prevent infection.

Since observing the rotted tubers at Olathe, a few tubers showing similar symptoms have been found in the San Luis Valley, the Greeley district, and the Carbondale district. The month of August was unusually warm in 1937 in all these districts. Other varieties showing symptoms were Brown Beauty, Red McClure, Russet Burbank, and Katahdin.

Summary

A disease, new to Colorado, was found on the Western Slope, in the San Luis Valley, at Carbondale, and at Greeley. The disease is evidently bacterial and appears to be Bacterial Wilt (*Bacterium solanacearum*, E.F.S.).

The Bliss Triumph seems to show more tuber rot than the Irish Cobbler. Vine and tuber symptoms were also observed on Rural New Yorker. Tuber symptoms have been observed on Brown Beauty, Red McClure, Russet Burbank, and Katahdin.

The temperatures in Montrose County were not any more favorable in 1937 than during most of the previous nine years, but August was considerably above normal compared with other sections of the state.

Rainfall was below most of the previous nine years. Potatoes had been over-irrigated.

Soil reactions are favorable for the development of the organism in all parts of the state.

The flea beetle has been increasing in Montrose County, and the infestation was particularly heavy in 1937.

Cultivating or hilling too late in the season may have helped spread the disease through excessive root injury.

LITERATURE CITED

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(2) Meier, F. C., and G. K. K. Link. 1923. Potato brown rot. U. S. D. A. Circ. 281.
(3) Eddins, A. H. 1936. Brown Rot of Irish potatoes and its control. Fla. Bul. 299.
(4) Bonde, Reiner. 1937. A bacterial wilt and soft rot of the potato in Maine. Phytopath 27: 106-108.
(5) Savile, D. B. O. and Racicot, H. N. 1937. Bacterial wilt and rot of potatoes. Sci. Agric. 17: 518-522.

REPORT OF THE TWENTY-FOURTH ANNUAL MEETING OF THE POTATO ASSOCIATION OF AMERICA

The Potato Association of America held its 24th Annual Meeting at Indianapolis, from December 28 to 30, 1937. Sessions were held in the Washington Hotel and joint sessions with the American Society for Horticultural Science and the American Phytopathological Societies at the Claypool and Severin Hotels, respectively. The meetings were well attended and an interesting program was presented. Most of the papers read at the various sessions will be printed in the American Potato Journal. A total of 47 papers and reports was presented at the four sessions.

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Potato Breeding, C. F. Clark, U. S. Department of Agriculture.

Fertilizer Investigations, Ora Smith, Cornell University.

Virus Diseases, T. P. Dykstra, U. S. Department of Agriculture.

Potato Insects, G. F. MacLeod, Cornell University.

Report of Secretary Treasurer

The Association has a membership of 1,293 as compared with 1,114 for 1936, and 812 in 1935. The largest number of members is in New Jersey, New York, Minnesota, Maine and Washington. In some of the largest of the potato-growing states, however the number of members is small. An effort is now being made to secure additional members in these states. This was made possible through the fact that the names of prominent growers were furnished us by representatives from these states and these men are now being circularized and are receiving sample copies of the Journal. There has been a good response from this and it is anticipated that within the next several months the membership in the Association will be increased to, at least 1,500.

This year, the Journal contained four hundred and eighty-one pages consisting of seventy-two pages of advertising and four hundred and nine of printed matter. This is an increase of forty-one pages compared with 1936 and fifty-three more than 1935. The Editor wishes to express his appreciation to those who sent in manuscripts and Sectional Notes. For the most part, the material was well prepared and did not require an excessive amount of editing. Some of the readers criticized the material that appeared in the Journal on the score that it was too technical. For this reason we have at-

tempted to print both popular and technical articles in each issue, so that every issue might appeal to all the readers. It is, of course, difficult to accomplish this but it does seem that it would be a mistake to attempt to publish only popular articles. The Editor would recommend the continuance of the present policy.

As in previous years, Dr. E. S. Clark rendered invaluable assistance in the work of editing the manuscripts submitted for publication in the Journal.

It was reported last year that an index had been prepared for all issues of the Journal. This has been checked and edited but unfortunately, sufficient funds have not been available for its publication. At the first opportunity this index will be published and mailed to the members.

STATEMENT OF ACCOUNTS FOR THE YEAR ENDING DECEMBER 21, 1937

Receipts

Balance from Dec. 21, 1936	$75.53
Annual Dues	1,297.14
Sale of Advertising	1,271.30
Reprint Receipts	236.72
Miscellaneous	53.96
Received from Michigan Bank on Acc't	14.56
TOTAL RECEIPTS	$2,949.21

Expenditures

Printing and Mailing of Journals (Nov. 1936 to Sept. 1937, incl.)	$1,543.11
Reprints	185.05
Miscellaneous	36.34
Secretarial Work	510.00
Stenographic Services	310.60
Stamps and Supplies	301.59
TOTAL EXPENDITURES	$2,886.69

Bank Balance Dec. 21, 1937—$62.52

Accounts Receivable

Reprints	$32.01
Memberships billed and Miscellaneous	36.50
Michigan Bank	116.50
Advertising	45.00
TOTAL ACCOUNTS RECEIVABLE	$230.01

Accounts Payable

October Journal and Reprints for 2 months..... $207.25

Report of the Auditing Committee

We, the undersigned Auditing Committee, have examined the books of the Potato Association of America and have found them to be in good order.

Ora Smith,
Julian C. Miller,
A. G. Tolaas.

SECTIONAL NOTES

CALIFORNIA

The Stockton Potato Crop is beginning to move—the potatoes are going generally to California Markets with a widely scattered demand from the Southwest, Midwest and East coming for these California Long White Potatoes.

The present price on Best Grades ranges from $1.00 to $1.10 on the Ranch; and .55 to .60 f.o.b. for Commercials.

A Meeting was held on the 3d of August, before the Pro-Rate Commission of the State of California; testimony was given in regard to the existing conditions in this territory.

It was proposed that any "Pro-Rate" should be based on eliminating small and low grades, rather than by reducing and pro-rating Carload Shipments.

This District will vote on the Government Late Potato Program between the 19th and 21st of August.

As opposed to unusually fine earlier prospects, it now appears that the Late Potato Crops in this District suffered materially from the heat which cut down the vines in a great many fields prematurely and will cause a considerably lighter yield than had been expected.

The acreage this year is approximately 500 less than last season and the final yields will probably show a corresponding decline. (Aug. 8). —E. Marx.

CONNECTICUT

The record-breaking rainfall during the week from the 18th to the 21st of July has influenced the potatoes in Connecticut adversely. Even if weather conditions are favorable the remainder of the season,

it is estimated that the yield has been reduced twenty-five per cent. This reduction is caused by several factors, all of which may be traced to the excessive precipitation. Firstly, the potatoes on many low lying, water-logged areas died of wilt because of insufficient air in the soil; secondly, because of the rain and ensuing mud, it was impossible to spray many fields for nearly two weeks, during which the weather was favorable for the spread of late blight; thirdly, most of the small patches of potatoes in home gardens or on general farms were not sprayed adequately to control blight and potatoes in this category are now dead or dying rapidly; and fourthly, the soluble plant nutrients have been leached from the soil zone occupied by the roots of potatoes. This factor may not be so important where the growth of vines is complete.

It is interesting to note how rapidly late blight appeared and spread in fields of potatoes which were well sprayed and which had scarcely a diseased leaf before the rainy period. It is also interesting that at Storrs the lowest minimum temperature since the 17th of July was 64° F.; the maximum was 87° F.; and the mean was 73° F.,—all temperatures above normal for this region. The relative humidity was very high, almost one hundred per cent, throughout most of the past two weeks. (Aug. 2).—B. A. BROWN.

IDAHO

The weather conditions have been ideal for growing the potato crop,—warm days and cool nights. A plentiful supply of irrigation water means another bumper crop, unless attacked by fungous diseases or early frosts. The condition of the crop at present is above our 5-year average. Nothing is moving from this district of the state. The movement of Early Triumphs and Russets in the Caldwell district is very light as the prices are barely above the cost of harvesting which means from 49 to 45 cents per hundred booked f.o.b. cars for the Triumphs.

We have information regarding the growers' attitude concerning the proposed marketing program. (Aug. 7).—E. P. WENGERT.

INDIANA

During the past month we have again been blessed with some very nice potato growing weather, with timely rains and not too high temperatures during the day and favorable temperatures at night in most lo-

calities. Our potato harvest is about completed. We find yields running from 275 to 350 bushels to the acre,—some yields are considerably better and a few are a little bit lower. The main troubles we have had this past season have been caused by leafhoppers and flea beetles, with very little, if any damage resulting from the Colorado potato beetle. The late-planted crop looks exceptionally well and our growers are getting in the field just as regularly as they possibly can to control the various pests. The potatoes in a number of the localities are retailing for approximately 65 cents to 75 cents a bushel, the farm price being reported from 50 to 55 cents for U. S. No. 1 Grade. Our growers are also finding a little competition in selling their potatoes, from some of the California potatoes that are being distributed over the state. For this year, I might say that our quality is just as good as that coming from other localities.

Our growers are greatly interested in anything that may be done to clarify the certified situation and any improvement will no doubt benefit the growers in our state. It is rather disappointing at times to find a sack full of potatoes that are over-size and that lack uniformity. In some cases, also, growers report that considerable amounts of diseases are prevalent in certified seed potatoes. Of course, there are always exceptions to the rule and we find quite a few individuals in the northern states that sell some good certified seed in our state, but those growers do not have a sufficient quantity to satisfy our needs. (Aug. 8).—W. B. Ward.

IOWA

This state ranks about 15th in potato production. It has 200,000 farmers and most of them grow a field of potatoes. About the same number of families live in small towns and villages, and most of them grow potatoes in their gardens. In the aggregate these small plantings are important in any estimate of the supply and the needs of the corn belt states.

At the end of July we finished a canvass of 105 regularly organized potato plats with the county agents and teachers of vocational agriculture in 20 counties of the state.

The crop is looking well but is small in size. The growth of the tubers was stopped by the early summer heat, and at the close of the season, growth was slow during the cool wet weather. Our crop is not large.

The prices of Cobblers on the Chicago market are very low compared with those of the Bliss, White Rose, and Burbank varieties.

Our muck crop seems likely to be of good shape and quality. Our growers are getting Chicago prices or more on the farm. Our muck-grown Cobblers, where well fertilized, sprayed, and graded are the best potatoes for general purposes that reach our markets.

A large delgation of Iowa growers attended the seed tour on the Iron Range in the woods about Duluth during the middle of August. There Tolaas and his men produce the best seed in the West. At Gilbert, Minnesota, W. F. Haenke is growing 30 acres planted with Douglass Atkins 15-year no-virus seed.

The Iowa Association is pushing the admission free from duty of 5-year no-virus seed from Prince Edward Island. (Aug. 9).—C. L. FITCH.

MAINE

Blight has not as yet so seriously affected the crop in Maine as conversation and correspondence might indicate. It is present everywhere and in some cases is very serious. Nevertheless, the total acreage affected is not great. With so much potential danger, however, from the presence of spores everywhere, continuation of recent unfavorable weather could easily lead to disastrous consequences. As yet, however, it is doubtful if production is curtailed materially. During the month the rainfall, to date, has been excessive. Growers are hoping that, by harvest time, there will be a change.

The seed situation has been of great concern to all growers this season, whether or not they be producers of certified seed. There was a tremendous spread of virus diseases last season,—more than has been true for seventeen years. Leaf roll has been the greatest problem particularly in the Southern part of Aroostook, whereas the Northern section has been more concerned with mosaic. This phenomenal increase in virus diseases has resulted in a drastic curtailment of acreage approved for certification. It seems probable now that not much more than 12,000 acres will pass the final inspection in contrast to 31,000 acres entered originally.

Fields that have been approved to date are being given continued critical attention to make certain that whatever stock is approved will merit confidence. The Department of Agriculture, represented by Mr. Newdick, has been uncompromising throughout the season. It is recognized by all that conditions must be faced in a realistic way.

One encouraging factor is that the sources of foundation seed in Maine upon which we have been depending in recent years have come through the ordeal successfully, with minor exceptions. In other words,

the isolation has proved effective even at a time when Maine suffered more from the spread of virus diseases than ever before in history. We are hopeful that this will encourage further development of isolated seed areas.

The reduction in crop estimates as of the 1st of August was about as expected. Based on present indications it is expected that a further decrease will be in order by the 1st of September.

Maine will vote on the Marketing Agreement on the 20th and 22d of August. Feeling runs high. So much so that with many individuals that discussion has passed the stage of careful analysis and reached the point of prejudice and intolerance. We are hopeful, however, that Maine will be included in the Marketing Agreement by the affirmative vote of all growers in the area.

Growers misunderstand the true basis of the Marketing Agreement through misinformation and arousal of prejudice by certain individuals. This has been difficult to combat, but we know that our growers will eventually recognize the fundamentals after it is put into operation and they can see it for themselves. (Aug. 13).—FRANK W. HUSSEY.

MICHIGAN

Exceptionally favorable growing conditions throughout July indicate that Michigan will have a fairly good crop of potatoes. Frequent rains have made the potato bug situation a problem. Many growers have sprayed more often than usual in order to control the bugs. The growers making the most progress in controlling the bugs are those that have been using from 6-8 pounds of calcium arsenate for each 100 gallons of spray.

The early-planted crop is now maturing and is finding a rather slow dull market. The yield of the early crop is exceptionally high; however the extreme heat of the past week will reduce the yields of the later-planted early crop.

The 20th Annual Meeting of the Michigan Potato Growers' Exchange at Cadillac, Michigan, was held on the 17th and 18th of August. The Exchange is a cooperative potato marketing organization that has been serving the Michigan farmers in a most satisfactory manner for the past twenty years. Fred P. Hibst, manager, is vitally interested in the State and Federal potato problems.

The acreage of certified potato seed is about the same as that of a year ago. The first inspection will be completed during the second week

in August. There are very few rejections this year. The growers are realizing more and more the value of maintaining a tuber unit area in their seed plot.

The greatest increase in acreage of any variety was in the new variety, Chippewa. This variety is producing excellent yields of potatoes, especially in the northern portion of the state. It is outyielding Green Mountan and Russet Rurals in many sections. (Aug. 8).—E. J. WHEELER.

NEBRASKA

The crop in Nebraska has been advancing satisfactorily in most areas since the July report. Part of the territory, however, has experienced very severe conditions, particularly in connection with the grasshoppers and blister beetles, and many fields are already a total loss. This trouble is confined to the northern part of our area, in Sioux, Dawes and Sheridan counties. This represents about one-third of the dry land area, in which potatoes are grown commercially. At least one-third of the crop in this area is already a total loss, and much of the rest is in danger of being lost.

Although the dry land crop over the balance of the territory is in reasonably good condition, the growth has been so rapid that rainfall is needed badly, and unless it comes within a short time, there will be serious results.

In our July report, we wrote that damage was being noted from psyllid yellows. Since that time, the early crop planted in western Nebraska is being dug, and the extent of damage is known. Many fields were a total loss in that there were no marketable potatoes. Most of this early crop consists of irrigated stock, and a yield of 300 bushels is about the average. The best fields affected with psyllid yellows this year produced about 100 bushels, and the quality was materially reduced as well. Psyllid yellows is also affecting our late crop principally under irrigation, but to a certain extent in the dry land areas. A great deal of spraying is being done, but commercial sprayers are entirely inadequate to take care of the trouble. The extent of the damage to the late crop is not known, but many fields appear to be damaged materially at this time. Since the insect can continue its trouble until the end of the season, it is possible that wide spread damage can occur where spraying is not available, or where it has been delayed in its application.

The table stock moving on the market is generally insufficient to take care of the demands. Various prices are being received, according to local conditions, varying from $1.00 to $1.20 per cwt. Practically

none of the crop is being moved out of the territory. It is being absorbed locally, because of its scarcity.

Growers are preparing for a vote on the marketing program. It is very difficult to tell at this time how they will react. It appears that the growers who have a good crop will be in favor of some restrictions, whereas those who will have a poor crop will vote against it. This rule, however, will not apply throughout, because some areas are quite bitterly against the marketing program as set up last year.

The certified seed industry is very much the same as that described for the commercial crop, and in those areas where insects have been troublesome there has been a number of fields, withdrawn from certification because of the fact that they are practically or entirely cleaned out. Our prospects for a crop are not so good as they were a month ago, because of these unfavorable conditions in part of the territory especially on the dry land. Aside from the psyllid infestation, which affects irrigated stock particularly severely, prospects for a crop in that area are about as usual for this time of year. (Aug. 8).—MARX KOEHNKE.

NEW HAMPSHIRE

The potato crop in New Hampshire is of a finer quality for this season of the year than during any season for the past ten years. Indications point toward a very satisfactory yield. Cobblers and other early varieties are just reaching the harvesting stage and those few that have been harvested are producing yields slightly above normal.

Some reports indicate that slight touches of early blight are appearing in certain sections. All pests and diseases have been very slight until the present time.

The Annual State Potato Tour covering a two-day period visiting the potato fields in the eastern section of the state was well attended. Very little trouble was evidenced in fields visited on this tour. As a whole, the potato growers have responded about 90 per cent in cooperation with the control program and to the present have received this program very favorably. The acreage of certified seed in the state is slightly increased above that of 1937. The most prevalent disease this year is leaf roll. The virus disease records in the state, as a whole, run somewhat lower than in 1937. (Aug. 13).—D. A. O'BRIEN.

NEW YORK

Growing conditions have been favorable in nearly all sections of New York during the past month. Rains have been general in the important potato counties and in fact storms have damaged the plants

in some areas. With higher than average temperatures and plenty of soil moisture, the top growth is well developed. Blight has appeared in Western New York but, as yet, not in damaging proportions. There is good reason to expect at least a normal crop for the state, unless unfavorable conditions prevail before harvest time.

The growers will be given an opportunity to vote on the Marketing Agreement between the 19th and 24th of August. Meetings are being held at the call of the Farm Bureaus to acquaint growers with the provisions of the marketing agreement ahead of the referendum. (Aug. 6).—E. V. HARDENBURG.

Late blight has been found in four counties in western and central New York, the first report in this part of the state being made on the 25th of July. The amount of blight is, of course, negligible at this time. On Long Island late blight has caused some damage to the crop this year in places where this disease usually does not do any damage. Considerable damage from early blight and also from flea beetles is also reported on the Island.

The weather does not seem to have been wholly satisfactory in the potato sections. In a number of localities, the growers are complaining of too much rain whereas others are suffering from drought. In the northern part of the state potatoes are looking unusually well and the weather has been apparently favorable, although rains have been rather frequent during the past week. (Aug. 5).—K. H. FERNOW.

NORTH DAKOTA

North Dakota has approximately the same acreage of Bliss Triumph and Irish Cobbler certified seed potatoes this year as last year. The acreage of certified Early Ohios has increased about 40 per cent. The general potato acreage in the state, including all common potatoes, is about the same as last year.

This state has had ideal moisture and growing conditions thus far during the season, and the potato crop is showing a great deal of health and vigor. The production will apparently be normal this season, from the standpoint of quality as well as quantity.

North Dakota potato growers will vote on the Marketing Agreement proposal during the latter part of August, and it is anticipated that this state will favor the new program. (Aug. 9).—E. M. GILLIG.

OREGON

The potato situation of the Klamath basin, briefly, is about as follows. The crop continued its excellent June progress throughout the

month of July and at the present time is the best prospect we have had in years. A number of growers report a tendency for growth cracks and other roughness during the latter part of the month. Additional information indicates that the acreage might be slightly heavier than estimated earlier in the season, perhaps reaching, or slightly exceeding, 20,000.

We have had a few early sales for August delivery and a car or two the first week in September at approximately 75 cents f.o.b. There have been no further sales of late potatoes. The individual grower's reaction to the Marketing Agreement is favorable and it is the consensus of opinion among the leading growers that the vote will be favorable.

Certified seed production is about the same as a year ago, with improved strains of Russets and White Rose added to the regular program. (Aug. 8).—C. A. HENDERSON.

RHODE ISLAND

The season to mid-July was ideal for potatoes and the crop was in excellent condition. A rainy spell during the latter half of July brought with it a heavy infestation of late blight. Unsprayed or poorly sprayed potatoes went down rapidly. Many small fields have resulted in complete losses.

Thorough spraying as followed by the best growers, brought the late crop through this period in very good shape and the prospects are now excellent for a satisfactory crop.

Cobblers are being harvested with an average-to-good yield. The Cobblers were well along toward maturity before the blight attacked the crop. A number of growers have planted from 10 to 20 acres of Chippewas this year. Some of these fields promise excellent yields, whereas others have suffered considerably from leaf roll.

Cobblers are ranging in price from $1.00 to $1.10 a hundred on the market. (Aug. 6).—T. E. ODLAND.

SOUTH DAKOTA

In general, the potato crop, both certified and commercial, looks well in the certified potato area within a radius of thirty to fifty miles

of Watertown. A few localities within the area have suffered from drought during the latter part of July and the early part of August but we still have prospects for a fair crop. Grasshoppers, blister beetles, and leafhoppers have been plentiful, but regular spraying or dusting has been effective in preventing serious damage, especially in the certified fields.

Field inspections have been completed on the certified fields and some of the early-planted fields will soon be ready for digging.

The annual Potato Tour was held on the 16th and 18th of July and was well attended, especially on the 18th. Most of the certified area was visited and special features such as dusting and spraying demonstrations were provided.

A large percentage of the certified potatoes will be marketed this season through a central marketing organization. At present, the writer is unaware of any price quotations which may have been offered to the growers. (August 10).—S. P. SWENSON.

ARE YOUR POTATOES ASKING FOR POTASH?

Potatoes are greedy feeders on potash. Furthermore, if they cannot get enough of this necessary plant food, they will show signs of potash starvation. The potato leaf will have an unnatural, dark green color and become crinkled and somewhat thickened. Later on, the tip will become yellowed and scorched, a condition which is sometimes confused with spray or insect injury.

The tip-burn then will extend along the leaf margins and inward toward the midrib, usually curling the leaf downward. In severe cases the whole plant may be affected, resulting in premature dying. Starvation symptoms usually appear on the lower leaves first and are more severe in dry seasons.

When fertilizing the potato crop, remember that potatoes remove from the soil more potash than both nitrogen and phosphoric acid combined. For a high yield of No. 1's, there must be at least 200 lbs. per acre of actual potash (K_2O) available to the growing plants.

Consult your county agent or experiment station about the fertility of your soils. See your fertilizer dealer or manufacturer. You will be surprised how little it costs to apply enough potash to insure good yields.

Write us for additional information and literature on how to fertilize your crops.

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Iron Age Single Row Kid-Glove Digger shown at work on Iron Age Farms, Grenloch, N. J., August 5, 1938.
Chippewa variety—measured acre yielded 481.08 bushels No. 1.

Although tubers were set wide on long stolons, all were harvested without injury (and sold at a premium), because of the wide 27 inch plow and elevator, together with other Kid-Glove features.
Excessively wet conditions this season, with the resultant heavy growth of grass and weeds, demand a heavy, strong and rugged Digger, in order to harvest the crop without costly delays, worriment and "strong language."

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